What is claimed is:

1. A method of cutting stent stock to a predetermined length to make a stent, the stent stock formed of a plurality of elongate strands braided to create a pattern of diamonds wherein the diamond vertices are defined by intersecting strands and are aligned to form a plurality of rows of vertices wherein each row lies in a plane which is substantially normal to a central axis of the stent stock, the cutting method forming a sphere on the end of each strand of the resulting stent, the method comprising:

providing a mandrel sized to receive a length of braided stent stock thereon, the mandrel having a central axis and an anchoring mechanism, operably attached thereto, and releasably fixing said stent stock relative to said mandrel;

providing a focused heat source capable of melting a predetermined length of one of the elongate strands;

providing a length of braided stent stock;

placing said stock on said mandrel at a predetermined axial position along said mandrel;

engaging said anchoring mechanism, thereby fixing said axial position of said stock length to said mandrel;

aligning said heat source with said stent stock such that said heat source is aimed substantially between two adjacent rows of vertices;

rotating said mandrel around said central axis at said predetermined angular speed in a first direction;

heating and separating, with said heat source, only those strands presenting acclivitous angles to the path of relative movement between the heat source and the stent stock;

rotating said mandrel around said central axis at said predetermined angular speed in a second direction opposite said first direction; and,

heating and separating all remaining strands using said heat source as said strands pass beneath said heat source.

2. The method of claim 1 wherein providing a heat source comprises providing a laser.

3. The method of claim 1 wherein providing a mandrel with an anchoring mechanism comprises providing a mandrel defining an inner channel and further defining a plurality of apertures each housing an inwardly biased, outwardly displaceable protuberance constructed and arranged to act as an anchoring mechanism for said stent stock when said protuberance is outwardly displaced.

4. The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises:

providing an elongate activation dowel constructed and arranged to be insertable into said inner channel and having an angled surface for progressively acting on said protuberances as said dowel is inserted into said inner channel; and,

inserting said activation dowel into said mandrel while monitoring the relative positions of said stent stock and said protuberances as said protuberances emerge from said cavities.

5. The method of claim 4 wherein providing a mandrel with an anchoring mechanism further comprises slightly sliding said stent stock along said axis, if necessary, to free said stock of any interference with said protuberances.

6. The method of claim 1 wherein cutting all remaining strands using said heat source as said strands pass beneath said heat source comprises allowing heat from said heat source to come within operable proximity to said stent stock while a strand passes beneath said heat source and preventing heat from said heat source from coming within operable proximity to said stent stock whenever no strand is present therebeneath.

7. The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises providing a mandrel defining apertures which extend radially from said central axis.

8. The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises providing a mandrel defining apertures each housing protuberances comprising pins having an outside diameter sized to snugly fit within said diamonds.

9. A device, insertable into a cutting machine chuck, and temporarily securing a length of stent stock so that the stent stock may be controllably moved relative to a heat source used to cut the stent, the device comprising:

an elongate mandrel defining an inner channel of a predetermined inside diameter;

at least one set of at least two angularly spaced apart apertures defined by, and extending radially through, said mandrel into said channel;

a plurality of inwardly biased, outwardly displaceable pins, slideably housed within said apertures; and,

an elongate activation dowel having:

- an angled portion extending from a front to a rear, said rear having a greater diameter than said front, said angled portion gradually increasing in diameter as it extends from said front to said rear; and,
- a cylindrical portion rearward of said angled portion having a diameter slightly smaller than the inside diameter of said inner channel.

10. The device of claim 9 wherein said mandrel further defines a groove adjacent said at least one set of pins.

11. The device of claim 9 further comprising springs acting on said pins, biasing said pins inwardly.

12. The device of claim 9 wherein said mandrel further defines two grooves juxtaposed between three sets of pins such that one set of pins lies between said grooves.

13. The device of claim 9 further comprising a plurality of reference markings useable to determine the position of a length of stent stock relative to said mandrel.

14. The device of claim 13 wherein said markings are arranged longitudinally on said mandrel.

15. The device of claim 13 wherein said markings are spaced apart a predetermined distance related to a dimension of the stent stock

16. A method of cutting stent stock to a predetermined length, the stent stock formed of a plurality of elongate strands braided such that the strands intersect to create a diamond pattern wherein the intersections define vertices of the diamonds and are substantially aligned to form a plurality of rows of vertices, the vertices in each row being substantially coplanar lying in a plane which is substantially normal to a central axis of the stent stock, the method comprising:

providing a focused heat source capable of creating an area of heat having an upper side and a lower side and providing sufficient heat to melt a predetermined length of one of the elongate strands;

providing a length of braided stent stock;

aligning said stent stock with said heat source such that said heat source is aimed substantially between two of the rows of vertices that are adjacent to each other;

rotating said stent stock relative to said heat source such that said heat source remains aimed substantially between the two adjacent rows of vertices;

intermittently allowing and preventing said area of heat from said heat source to come within operable proximity to said stent stock such that only strands having substantially acclivitous angles relative to said heat source are subjected to said area of heat and are melted, thereby forming a sphere on said strand proximate the upper side of said area of heat, until all strands having acclivitous angles relative to said heat source are melted;

reversing said relative rotation between said heat source and said stent stock such that the remaining strands present acclivitous angles to said heat source as the strands enter said area of heat; and,

subjecting the remaining strands to said area of heat, thereby forming a sphere on each remaining strand proximate the upper side of said area of heat.

17. The method of claim 16 further comprising:
providing a mandrel sized to receive said length of braided stent stock thereon, said mandrel having an anchoring mechanism operably attached thereto releasably fixing said stent stock relative to said mandrel;
placing said stock on said mandrel at a predetermined axial position; and,
engaging said anchoring mechanism, thereby fixing said axial position of said stock length to said mandrel.

18. The method of claim 17 further comprising the steps of:
providing a mechanism for turning said mandrel around its central axis at a predetermined angular speed; and,
rotating said mandrel around said central axis at said predetermined angular speed using said turning mechanism.

19. The method of claim 16 further comprising making a plurality of cuts in a similar manner, moving said stent stock in a direction along said axis relative to said heat source between each cut, thereby forming a plurality of stents having two ends defined by the cut strands, each of said strands having a sphere on each end.

20. A device, insertable into a laser cutting machine, constructed and arranged to releasably position stent stock while the cutting machine cuts stents therefrom, the stent stock having an inside diameter and defining a plurality of diamond shaped openings, the device comprising:
a mandrel having an outside diameter smaller than the inside diameter of the stent stock; and,
a plurality of protuberances operably attached to said mandrel and sized to protrude through the diamond shaped openings, thereby temporarily fixing said stent stock to

said mandrel, the protuberances displaceable between an engaged and a disengaged position whereby when said protuberances are in said engaged position, the stent stock is fixed relative to said mandrel, and when said protuberances are in said disengaged position, the stent stock is slideable relative said mandrel.

21. The device of claim 20 wherein said protuberances comprise pins having an outside diameter sized to snugly fit within the diamond shaped openings.

22. The device of claim 21 wherein said mandrel comprises a plurality of apertures, displaceably housing said pins.

23. The device of claim 22 wherein said pins are inwardly biased toward said disengaged position.

24. The device of claim 22 wherein said mandrel further comprises an inner channel, defined by said mandrel, extending from an end of said mandrel to said apertures, the inner channel providing access to said pins such that said pins may be displaced to said engaged position.

25. The device of claim 24 further comprising an activation dowel, insertable within said channel, the activation dowel comprising:

an activation portion, having a shape of a frustum, constructed and arranged to gradually act on said pins such that said pins are displaced from said disengaged position to said engaged position when said activation portion is moved within said channel past said pins; and,

an elongate portion operably attached to said activation portion, having a cross section substantially equal to said activation portion where said activation portion is attached to said elongate portion, and having a length sufficient to move said activation portion past said pins, and having outside surfaces maintaining said pins in said engaged position when said activation dowel is fully inserted within said channel.

26. The device of claim 23 further comprising springs, operably attached to said pins, urging said pins to said disengaged position.

27. The device of claim 25 wherein said frustum comprises a section of a cone.

28. The device of claim 25 wherein said frustum comprises a section of a pyramid.

29. The device of claim 25 wherein said activation portion further comprises a continuous outer surface.

30. The device of claim 20 further comprising a plurality of reference markings useable to determine the position of a length of stent stock relative to said mandrel.

31. A method of cutting a length of braided stent stock using heat from a focused heat source, the stent stock having a plurality of strands helically braided such that half of the strands take the form of a right-handed helix and the other half take the form of a left-handed helix, the right-handed helixes arranged equidistantly from each other to loosely define a cylinder having a central axis, the left-handed helixes arranged equidistantly from each other and interwoven with said right-handed helixes to better define said cylinder and to form a plurality of intersections between the strands of the right-handed helixes and the left-handed helixes, the intersections and the strands thereby forming a relatively uniform pattern of diamonds having vertices defined by the intersections and sides defined by the strands, the method comprising:

aligning the heat source relative to the stent stock so the heat source is aimed at the stent stock between two longitudinally adjacent vertices;

rotating the stock around its central axis in operable proximity to the heat source in a first direction;

allowing heat from the heat source to come within operable proximity to the stent stock whenever a strand forming a left-handed helix passes by the heat source, thereby melting the strand and forming a sphere thereon;

preventing heat from the heat source from coming within operable proximity to the stent stock before a strand forming a right-handed helix passes by the heat source;

rotating the stock in a second direction, opposite the first direction, after all of the strands forming a left-handed helix have been melted by the heat source; and,

allowing heat from the heat source to come within operable proximity to the stent stock whenever a strand forming a right-handed helix passes by the heat source, thereby melting the strand and forming a sphere thereon.

32. The method of claim 31 wherein allowing heat from the heat source to come within operable proximity to the stent stock comprises turning the heat source on.

33. The method of claim 31 wherein allowing heat from the heat source to come within operable proximity to the stent stock comprises opening a shutter to allow said heat to pass therethrough.

34. The method of claim 31 wherein preventing heat from the heat source from coming within operable proximity to the stent stock comprises turning the heat source off.

35. The method of claim 31 wherein preventing heat from the heat source from coming within operable proximity to the stent stock comprises closing a shutter to block said heat from passing therethrough.

36. The method of claim 31 further comprising preventing heat from the heat source from coming within operable proximity to the stent stock, while rotating the stock in said second direction, substantially whenever a strand forming a right-handed helix is not passing by the heat source.

37. A stent for placement in a body lumen comprising:
a plurality of right-handed helical strands, each having a first end and a second end;
a plurality of left-handed helical strands, each having a first end and a second end;
said plurality of right-handed helical strands being interwoven with said plurality of left-handed helical strands such that said stent has a periphery defined by a series of diamond-shaped openings; and,
said first end of each of said plurality of right and left-handed helical strands including a sphere formed from melting a predetermined length of each of said first ends, said predetermined length being partially defined by an acclivitous angle at which each of said first ends contact an energy field emanating from a melting source.

38. A stent according to claim 37, wherein said second end of each of said plurality of right and left-handed helical strands includes a sphere formed from melting a predetermined length of each of said second ends, said predetermined length being partially defined by an acclivitous angle at which each of said second ends contact an energy field emanating from a melting source.

39. A stent according to claim 37, wherein said predetermined length is further defined by a speed at which each of said first ends and said energy field pass each other.

40. A stent according to claim 37, wherein said melting source is a laser.

41. A stent according to claim 37, wherein said acclivitous angle is in the range of approximately 130 to 175 degrees.

42. A stent according to claim 37, wherein said predetermined length is further defined by an effective path width of said energy field emanating from said melting source.

43. A stent according to claim 39, wherein said speed is a rotational speed.

44. A stent according to claim 43, wherein said rotational speed is less than 10 rotations per minute.

45. A stent according to claim 44, wherein said rotational speed is on the order of 6 rotations per minute.

46. A stent according to claim 38, wherein said melting source used to form said spheres on said first ends is the same as said melting source used to from said spheres on said second ends.

47. A method of fabricating a stent comprising:

providing a stock of stent material of braided wires;

determining a length of a segment to separate from said stent material;

separating said segment from said stent material such that each of said wires has a gap defined between a wire upper end and a wire bottom end; and,

at a time no earlier than said act of separating, melting a predetermined length of said upper end of each of said wires so as to form a sphere on said upper end of each of said wires, said predetermined length being defined at least by an effective melting source path width and by an acclivitous angle at which said upper end and a melting source contact each other.

48. A method according to claim 47, wherein, at a time no earlier than said act of separating, melting a predetermined length of said bottom end of each of said wires so as to form a sphere on said bottom end of each of said wires, said predetermined length being defined at least by an effective melting source path width.

49. A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is done simultaneously with said act of separating.

50. A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is done after said act of separating.

51. A method according to claim 48, wherein said melting a predetermined length of said upper ends and bottom ends of each of said wires is done simultaneously with said act of separating.

52. A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is performed such that each end is melted in a sequential manner.

53. A method according to claim 47, wherein said acclivitous angle is in the range of approximately 130 to 175 degrees.

54. A method according to claim 47, wherein melting a predetermined length of said upper end of each of said wires so as to form a sphere on said upper end of each of said wires comprises:

aligning said melting source relative to said stent material so said melting source is aimed at said stent material between two longitudinally adjacent rows of vertices formed by intersecting wires;

rotating said stent material in operable proximity to said melting source in a first direction;

emitting energy from said melting source toward said stent before said melting source, and any of said wires presenting said acclivitous angle, pass each other;

preventing said melting source from emitting energy toward said stent before said melting source, and any of said wires presenting a declivitous angle, come into operable proximity;

rotating said stent material in operable proximity to said melting source in a second direction, opposite said first direction, after all of said wires presenting said acclivitous angles have passed said melting source, such that said wires presenting declivitous angles now present acclivitous angles relative to the heat source; and,

turning said melting source on before said melting source, and any of said wires presenting said acclivitous angle, pass each other.